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9 December 1958

MEMORANDUM FOR: Special Assistant to the Director for Planning  
and Development

SUBJECT: Equipment Programming and Anticipated Costs,  
Project "C"

1. At your request, we have assembled as many factors as possible pertaining to the procurement of equipment needed to exploit Project "C" type materials. This included the location of possible equipment manufacturers, careful analysis of proposals, and selection of the equipment which is most versatile and of highest quality. Many of the items on the following lists are already available because of the intensive R & D Program followed by PIC which emphasizes versatility.

2. Those items developed and procured by PIC in expectation of the receipt of 461-L material are all directly applicable to Project "C", whereas those items developed by ITEK for the 461-L program would require major modification.

3. Since "cost-consciousness" was a primary consideration, we have divided our requirements in the following study into three categories: e.g., those items required as an absolute minimum (see TAB "A"); those items which we would prefer to have (see TAB "B"); and, items giving optimum capability for maximum effort (see TAB "C"). Major differences in cost are due essentially to the increased numbers required in each category. Even in the case of Category I (our minimum requirements), there was no sacrifice of quality in terms of resolution and image quality.

4. All items listed in the attached TABS are numbered in accordance with the equipment sheets contained in Project "C" Notes (TS 159036). No considerations, other than technical, were given by PIC to the HYAC II Camera (Item 1) or to the 70mm Film Processor (Item 2) as they are of primary concern to the operational side of the Project.

5. Items in each Category marked by a single asterisk (\*) are presently available at PIC to exploit Project "C" type material; items marked with a double asterisk (\*\*) require modification to increase their basic capability.

NRO review(s) completed.

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6. A number of considerations used in the selection of equipment, costs, etc. were kept in mind. For your information, the essence of these follows:

a. Regarding Precision Optical Rectification: The precision optical rectifier proposal by ITEK at [ ] and with a lead time of  $2\frac{1}{2}$  years is not considered an optimum solution by PIC, and therefore has not been included in the proposed budget under any of the Categories. A far more versatile instrument would be the electronic rectifier which is presently under development contract with the HYCON Manufacturing Company. Optical rectifiers can be built to handle only a small range of focal lengths, whereas the electronic rectifier will handle any focal length as well as differing altitude, tilt, yaw, etc. factors, all of which readily can be programmed and controlled by a punched tape operation. The development work of an electronic rectifier is more than half finished and a bread-board model is in production. The prototype can be made in less than one year and at about one-half the cost of the unit proposed by ITEK. Since the primary reason for a precision rectifier in Project "C" is to produce geodetic and cartographic materials, work on the HYCON production model should be started as soon as the collection results warrant the expenditure.

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b. PIC Systems Concept: All equipment procured or developed for PIC under the system concept is designed to be useful in the exploitation of photography of any format and focal length. For example, by using the Mann Comparator, the electronic computer and the Benson-Lehner Automatic X-Y Plotter, many points on any oblique photograph can be semi-automatically rectified and plotted, whether the photograph be from the 3" curved focal plane tracker, the "B" Camera, "C" Camera or the HYAC II Cameras. One of the prime points of difference between our systems concept approach and that taken by ITEK is that ITEK tends to build equipment to exploit the results from a single collection medium and an entirely Project 461-L would have to undergo major modification or completely new hardware would have to be developed in order to apply it to Project "C" - which basically consists of a change in focal lengths from the geometric standpoint.

c. Minicard Considerations: All photography resulting from Project "C" must be put into the Minicard data retrieval system as soon as possible. We have discussed with EK and with your procurement personnel the Minicard requirements as we visualize them today.

Currently available Minicard equipment is geared for handling aerial photography, and the systems applied to input and recall, are considered adequate to cope with all aspects of "C" photography. Three special pieces, however, are required

\* new set for another medium. This is illustrated well in that nearly all of the equipment produced for

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to provide for a new application of Minicard to this type of material. The cost estimates in TABs "A", "B" and "C" do not include the cost of development or production. They are: (a) a step and repeat recording camera with a 90° reversed photo head and 5:1 reduction capability, (b) a slit recording camera and, (c) a digital readout printer. The 5:1 reduction camera would be designed to prevent any significant loss of image quality and resolution, the slit recording camera would produce strips for 200X projection enlargement, both employing a 500 line /mm lens. The 200X enlargements would be used in exploitation by group viewing. Eastman Kodak Co. is developing cost estimates, but not as much urgency need be applied to this aspect of procurement.

d. Community Buying: Joint Agency procurement under Project "Jigger" in FY 1958 has been a tremendous success from the reports we have received from the Services. Unit prices are less, since the development costs are divided on a pro-rata basis among all purchasers. For example, the Army in spending [redacted] in joint procurement last year saved [redacted] over that which it would have cost to purchase unilaterally. It was possible to purchase 17 items of additional equipment with the savings. By the same token Project "C" procurement should be much more economical and efficient if it can be done on a Joint basis. We already know that the Houston-Fearless processor will cost [redacted] less for two than for one only.

e. Quality of Service: The system as planned will provide timely support to the Services and other customers comparable to that which the present exploitation program provides.

7. Since some of the items, such as the Nadir Computation Device, the AIWAC Compiler Programming, etc., require long lead-times for development and manufacture (about 5 months), it is imperative that contracts be let as soon as possible, if we are to do our share at the appropriate time. It, therefore, would be appreciated if we could receive your concurrence soonest to our lines of reasoning as set forth above and obtain authorization to proceed with the necessary contractual paperwork through your procurement personnel

[redacted]  
A. C. LUNDAHL  
Director  
Photographic Intelligence Center

Enclosures:  
A/S

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